APPENDIX 1

A general analysis of which kind of radio-nuclides could be produced with the neutron Activator has been performed. Target elements must be natural elements which are optionally selected with an isotopic enrichment, though costly. The neutron capture process leads to a daughter element which is unstable, with a reasonable lifetime, conservatively chosen to be between one minute and one year. In turn, the next daughter element can be either stable or unstable. If it is stable, the process is defined as "activation" of the sample. Since a second isotopic separation is unrealistic, the activated compound must be used directly. A practical example of this is the ^{128}I activation from a natural Iodine compound ($^{127}I \rightarrow$ ^{128}I). If, instead, the first daughter element decays into another unstable (the same time window has been used) chemical species, which can be separated with an appropriate technique, the present method may constitute a way to produce pure, separated radio-nuclides for practical applications. As practical example, one may refer to the chain $^{98}Mo \rightarrow {}^{99}Mo \rightarrow {}^{99m}Tc$.

The suitability of a given production/decay chain to our proposed method depends on the size of the neutron capture cross-section. Two quantities are relevant: the resonance integral I_{res}, which is related to the use of a high A diffusing medium such as Lead, and the thermal capture cross-section which suggests the use of a low A diffuser such as Graphite. Another relevant parameter is the fractional content of the father nuclear species in the natural compound, which is relevant to the possible need of isotopic preparation of the target sample.

Target	Isotope	Natur. Conc.	Reson. Integr.	Therm. X-sect	Activated Isotope	half-life activated	Decay mode	Decay Br. R.	Next Isotope	half-life next Isot.
Na	Na- 23	1.00	0.26	0.607	Na- 24	14.96 h	β–	100.0		
Mg	Mg- 26	0.1101	0.016	0.0439	Mg- 27	9.458 m	β–	100.0		
Al	Al- 27	1.00	0.112	0.244	Al- 28	2.241 m	β–	100.0		
Si	Si- 30	0.031	0.697	0.124	Si- 31	2.622 h	β–	100.0		
P	P - 31	1.00	0.0712	0.207	P - 32	14.26 d	β–	100.0		
S	S - 34	0.0421	0.0835	0.256	S - 35	87.51 d	β–	100.0		
S	S - 36	0.0002	0.10	0.167	S - 37	5.050 m	β–	100.0		
Cl	Cl- 37	0.2423	0.0025	0.	Cl- 38	37.24 m	β–	100.0		
Ar	Ar- 36	0.0034	1.68	6.0	Ar- 37	35.04 d	β+	100.0		
Ar	Ar- 40	0.996	0.231	0.756	Ar- 41	1.822 h	β–	100.0		
K	K - 41	0.0673	1.44	1.67	K - 42	12.36 h	β–	100.0		
Ca	Ca- 44	0.0209	0.32	1.02	Ca- 45	163.8 d	β–	100.0		
Ca	Ca- 46	0.00	0.252	0.85	Ca- 47	4.536 d	β–	100.0	Sc- 47	3.345 d
Ca	Ca- 48	0.0019	0.379	1.26	Ca- 49	8.715 m	β–	100.0	Sc- 49	57.20 m
Sc	Sc- 45	1.00	9.24	31.10	Sc- 46	83.79 d	β–	100.0		
Ti	Ti- 50	0.054	0.0682	0.204	Ti- 51	5.760 m	β–	100.0		
V	V - 51	0.9975	2.08	5.62	V - 52	3.750 m	β–	100.0		
Cr	Cr- 50	0.0434	5.94	18.20	Cr- 51	27.70 d	β+	100.0		
Cr	Cr- 54	0.0237	0.167	0.412	Cr- 55	3.497 m	β–	100.0		
Mn	Mn- 55	1.00	10.50	15.40	Mn- 56	2.579 h	β–	100.0		
Fe	Fe- 58	0.0028	1.36	1.32	Fe- 59	44.50 d	β–	100.0		
Co	Co- 59	1.00	72.0	42.70	Co- 60*	10.47 m	β–	0.24		
Co	Co- 59	1.00	72.0	42.70	Co- 60*	10.47 m	γ	99.76		
Ni	Ni- 64	0.0091	0.627	1.74	Ni- 65	2.517 h	β–	100.0		
Cu	Cu- 63	0.6917	4.47	5.11	Cu- 64	12.70 h	β+	61.0		
Cu	Cu- 63	0.6917	4.47	5.11	Cu- 64	12.70 h	β–	39.0		
Cu	Cu- 65	0.3083	1.96	2.46	Cu- 66	5.088 m	β–	100.0		
Zn	Zn- 64	0.486	1.38	0.877	Zn- 65	244.3 d	β+	100.0		
Zn	Zn- 68	0.188	2.89	1.15	Zn- 69	56.40 m	β–	100.0		
Zn	Zn- 68	0.188	2.89	1.15	Zn- 69*	13.76 h	γ	99.97	*Zn- 69*	*56.40 m*
Zn	Zn- 68	0.188	2.89	1.15	Zn- 69*	13.76 h	β–	0.03		

Target	Isotope	Natur. Conc.	Reson. Integr.	Therm. X-sect	Activated Isotope	half-life activated	Decay mode	Decay Br. R.	Next Isotope	half-life next Isot.
Zn	Zn- 70	0.006	0.117	0.105	Zn- 71	2.450 m	β–	100.0		
Zn	Zn- 70	0.006	0.117	0.105	Zn- 71*	3.960 h	γ	0.05	*Zn- 71*	*2.450 m*
Zn	Zn- 70	0.006	0.117	0.105	Zn- 71*	3.960 h	β–	99.95		
Ga	Ga- 69	0.601	18.0	2.52	Ga- 70	21.14 m	β–	99.59		
Ga	Ga- 69	0.601	18.0	2.52	Ga- 70	21.14 m	β+	0.41		
Ga	Ga- 71	0.399	31.80	4.26	Ga- 72	14.10 h	β–	100.0		
Ge	Ge- 70	0.205	2.23	3.35	Ge- 71	11.43 h	β+	100.0		
Ge	Ge- 74	0.365	0.416	0.482	Ge- 75	1.380 h	β–	100.0		
Ge	Ge- 76	0.078	1.31	0.172	Ge- 77	11.30 h	β–	100.0	As- 77	1.618 d
As	As- 75	1.00	63.50	5.16	As- 76	1.097 d	β–	99.98		
As	As- 75	1.00	63.50	5.16	As- 76	1.097 d	β+	0.02		
Se	Se- 74	0.009	575.0	59.40	Se- 75	119.8 d	β+	100.0		
Se	Se- 78	0.236	4.70	0.492	Se- 79*	3.920 m	γ	99.94		
Se	Se- 78	0.236	4.70	0.492	Se- 79*	3.920 m	β–	0.06		
Se	Se- 80	0.497	0.928	0.699	Se- 81	18.45 m	β–	100.0		
Se	Se- 80	0.497	0.928	0.699	Se- 81*	57.28 m	γ	99.95	*Se- 81*	*18.45 m*
Se	Se- 80	0.497	0.928	0.699	Se- 81*	57.28 m	β–	0.05		
Se	Se- 82	0.092	0.795	0.0506	Se- 83	22.30 m	β–	100.0	Br- 83	2.400 h
Se	Se- 82	0.092	0.795	0.0506	Se- 83*	1.168 m	β–	100.0	Br- 83	2.400 h
Br	Br- 79	0.5069	128.0	12.60	Br- 80	17.68 m	β+	8.3		
Br	Br- 79	0.5069	128.0	12.60	Br- 80	17.68 m	β–	91.7		
Br	Br- 79	0.5069	128.0	12.60	Br- 80*	4.421 h	γ	100.0	*Br- 80*	*17.68 m*
Br	Br- 81	0.4931	46.40	3.09	Br- 82	1.471 d	β–	100.0		
Br	Br- 81	0.4931	46.40	3.09	Br- 82*	6.130 m	γ	97.6	*Br- 82*	*1.471 d*
Br	Br- 81	0.4931	46.40	3.09	Br- 82*	6.130 m	β–	2.4		
Kr	Kr- 78	0.0035	25.10	7.11	Kr- 79	1.460 d	β+	100.0		
Kr	Kr- 82	0.116	225.0	32.20	Kr- 83*	1.830 h	γ	100.0		
Kr	Kr- 84	0.57	3.47	0.0952	Kr- 85*	4.480 h	β–	78.6		
Kr	Kr- 84	0.57	3.47	0.0952	Kr- 85*	4.480 h	γ	21.4		
Kr	Kr- 86	0.173	0.023	0.34	Kr- 87	1.272 h	β–	100.0		
Rb	Rb- 85	0.7217	8.68	0.551	Rb- 86	18.63 d	β+	0.005		
Rb	Rb- 85	0.7217	8.68	0.551	Rb- 86	18.63 d	β–	99.99		
Rb	Rb- 85	0.7217	8.68	0.551	Rb- 86*	1.017 m	γ	100.0	*Rb- 86*	*18.63 d*
Rb	Rb- 87	0.2784	2.70	0.137	Rb- 88	17.78 m	β–	100.0		
Sr	Sr- 84	0.0056	10.40	0.929	Sr- 85	64.84 d	β+	100.0		
Sr	Sr- 84	0.0056	10.40	0.929	Sr- 85*	1.127 h	β+	13.4		
Sr	Sr- 84	0.0056	10.40	0.929	Sr- 85*	1.127 h	γ	86.6	*Sr- 85*	*64.84 d*
Sr	Sr- 86	0.0986	4.70	1.19	Sr- 87*	2.803 h	γ	99.7		
Sr	Sr- 86	0.0986	4.70	1.19	Sr- 87*	2.803 h	β+	0.3		
Sr	Sr- 88	0.8258	0.0628	0.66	Sr- 89	50.53 d	β–	99.991		
Sr	Sr- 88	0.8258	0.0628	0.66	Sr- 89	50.53 d	β–	0.009		

Target	Isotope	Natur. Conc.	Reson. Integr.	Therm. X-sect	Activated Isotope	half-life activated	Decay mode	Decay Br. R.	Next Isotope	half-life next Isot.
Y	Y - 89	1.00	0.821	1.48	Y - 90	2.671 d	β–	100.0		
Y	Y - 89	1.00	0.821	1.48	Y - 90*	3.190 h	γ	100.0	*Y - 90*	*2.671 d*
Y	Y - 89	1.00	0.821	1.48	Y - 90*	3.190 h	β–	0.002		
Zr	Zr- 94	0.1738	0.316	0.057	Zr- 95	64.02 d	β–	98.89	Nb- 95	34.97 d
Zr	Zr- 94	0.1738	0.316	0.057	Zr- 95	64.02 d	β–	1.11	Nb- 95*	3.608 d
Zr	Zr- 96	0.028	5.86	0.0261	Zr- 97	16.90 h	β–	5.32	Nb- 97	1.202 h
Zr	Zr- 96	0.028	5.86	0.0261	Zr- 97	16.90 h	β–	94.68		
Nb	Nb- 93	1.00	9.78	1.32	Nb- 94*	6.263 m	γ	99.5		
Nb	Nb- 93	1.00	9.78	1.32	Nb- 94*	6.263 m	β–	0.5		
Mo	Mo- 92	0.1484	0.967	0.0237	Mo- 93*	6.850 h	γ	99.88		
Mo	Mo- 92	0.1484	0.967	0.0237	Mo- 93*	6.850 h	β+	0.12		
Mo	Mo- 98	0.2413	6.54	0.149	Mo- 99	2.747 d	β–	12.5		
Mo	Mo- 98	0.2413	6.54	0.149	Mo- 99	2.747 d	β–	87.5	Tc- 99*	6.010 h
Mo	Mo-100	0.0963	3.88	0.228	Mo-101	14.61 m	β–	100.0	Tc-101	14.22 m
Ru	Ru- 96	0.0552	7.26	0.332	Ru- 97	2.900 d	β+	99.962		
Ru	Ru- 96	0.0552	7.26	0.332	Ru- 97	2.900 d	β+	0.038	Tc- 97*	90.10 d
Ru	Ru-102	0.316	4.17	1.41	Ru-103	39.26 d	β–	0.25		
Ru	Ru-102	0.316	4.17	1.41	Ru-103	39.26 d	β–	99.75	Rh-103*	56.11 m
Ru	Ru-104	0.187	6.53	0.37	Ru-105	4.440 h	β–	72.0	Rh-105	1.473 d
Ru	Ru-104	0.187	6.53	0.37	Ru-105	4.440 h	β–	28.0		
Rh	Rh-103	1.00	928.0	169.0	Rh-104*	4.340 m	γ	99.87		
Rh	Rh-103	1.00	928.0	169.0	Rh-104*	4.340 m	β–	0.13		
Pd	Pd-102	0.0102	19.20	3.85	Pd-103	16.99 d	β+	0.1		
Pd	Pd-102	0.0102	19.20	3.85	Pd-103	16.99 d	β+	99.9	Rh-103*	56.11 m
Pd	Pd-108	0.2646	251.0	9.77	Pd-109	13.70 h	β–	0.05		
Pd	Pd-108	0.2646	251.0	9.77	Pd-109	13.70 h	β–	99.95		
Pd	Pd-108	0.2646	251.0	9.77	Pd-109*	4.696 m	γ	100.0	*Pd-109*	*13.70 h*
Pd	Pd-110	0.1172	2.79	0.261	Pd-111	23.40 m	β–	0.75	Ag-111	7.450 d
Pd	Pd-110	0.1172	2.79	0.261	Pd-111	23.40 m	β–	99.25	Ag-111*	1.080 m
Pd	Pd-110	0.1172	2.79	0.261	Pd-111*	5.500 h	γ	73.0	*Pd-111*	*23.40 m*
Pd	Pd-110	0.1172	2.79	0.261	Pd-111*	5.500 h	β–	7.5	Ag-111	7.450 d
Pd	Pd-110	0.1172	2.79	0.261	Pd-111*	5.500 h	β–	19.5	Ag-111*	1.080 m
Ag	Ag-107	0.5184	100.	44.20	Ag-108	2.370 m	β–	97.15		
Ag	Ag-107	0.5184	100.	44.20	Ag-108	2.370 m	β+	2.85		
Ag	Ag-109	0.4816	1460.	104.0	Ag-110*	249.8 d	γ	1.36		
Ag	Ag-109	0.4816	1460.	104.0	Ag-110*	249.8 d	β–	98.64		
Cd	Cd-106	0.0125	10.60	1.11	Cd-107	6.500 h	β+	0.06		
Cd	Cd-106	0.0125	10.60	1.11	Cd-107	6.500 h	β+	99.94		
Cd	Cd-110	0.1249	38.20	12.60	Cd-111*	48.54 m	γ	100.0		
Cd	Cd-114	0.2873	16.90	0.391	Cd-115	2.227 d	β–	0.0		
Cd	Cd-114	0.2873	16.90	0.391	Cd-115	2.227 d	β–	100.0	In-115*	4.486 h
Cd	Cd-114	0.2873	16.90	0.391	Cd-115*	44.60 d	β–	99.989		
Cd	Cd-114	0.2873	16.90	0.391	Cd-115*	44.60 d	β–	0.011	In-115*	4.486 h

Target	Isotope	Natur. Conc.	Reson. Integr.	Therm. X-sect	Activated Isotope	1/e life activated	Decay mode	Decay Br. R.	Next Isotope	half-life next Isot.
Cd	Cd-116	0.0749	1.74	0.0859	Cd-117	2.490 h	β–	8.4	In-117	43.20 m
Cd	Cd-116	0.0749	1.74	0.0859	Cd-117	2.490 h	β–	91.6	In-117*	1.937 h
Cd	Cd-116	0.0749	1.74	0.0859	Cd-117*	3.360 h	β–	98.6	In-117	43.20 m
Cd	Cd-116	0.0749	1.74	0.0859	Cd-117*	3.360 h	β–	1.4	In-117*	1.937 h
In	In-113	0.043	322.0	13.90	In-114	1.198 m	β–	99.5		
In	In-113	0.043	322.0	13.90	In-114	1.198 m	β+	0.5		
In	In-113	0.043	322.0	13.90	In-114*	49.51 d	γ	95.6	*In-114*	*1.198 m*
In	In-113	0.043	322.0	13.90	In-114*	49.51 d	β+	4.4		
In	In-115	0.957	3110.	232.0	In-116*	54.41 m	β–	100.0		
Sn	Sn-112	0.0097	30.40	1.16	Sn-113	115.1 d	β+	0.0		
Sn	Sn-112	0.0097	30.40	1.16	Sn-113	115.1 d	β+	100.0	In-113*	1.658 h
Sn	Sn-112	0.0097	30.40	1.16	Sn-113*	21.40 m	γ	91.1	*Sn-113*	*115.1 d*
Sn	Sn-112	0.0097	30.40	1.16	Sn-113*	21.40 m	β+	8.9		
Sn	Sn-116	0.1453	12.40	0.147	Sn-117*	13.60 d	γ	100.0		
Sn	Sn-118	0.2422	5.32	0.25	Sn-119*	293.1 d	γ	100.0		
Sn	Sn-120	0.3259	1.21	0.16	Sn-121	1.127 d	β–	100.0		
Sn	Sn-122	0.0463	0.916	0.21	Sn-123	129.2 d	β–	100.0		
Sn	Sn-122	0.0463	0.916	0.21	Sn-123*	40.06 m	β–	100.0		
Sn	Sn-124	0.0579	7.84	0.155	Sn-125	9.640 d	β–	100.0		
Sn	Sn-124	0.0579	7.84	0.155	Sn-125*	9.520 m	β–	100.0		
Sb	Sb-121	0.573	213.0	6.88	Sb-122	2.700 d	β–	97.6		
Sb	Sb-121	0.573	213.0	6.88	Sb-122	2.700 d	β+	2.4		
Sb	Sb-121	0.573	213.0	6.88	Sb-122*	4.210 m	γ	100.0	*Sb-122*	*2.700 d*
Sb	Sb-123	0.427	122.0	4.80	Sb-124*	60.20 d	β–	100.0		
Sb	Sb-123	0.427	122.0	4.80	Sb-124*	1.550 m	γ	75.0	*Sb-124*	*60.20 d*
Sb	Sb-123	0.427	122.0	4.80	Sb-124*	1.550 m	β–	25.0		
Sb	Sb-123	0.427	122.0	4.80	Sb-124**	20.20 m	γ	100.0	*Sb-124**	*1.550 m*
Te	Te-120	0.001	22.20	2.69	Te-121	16.78 d	β+	100.0		
Te	Te-120	0.001	22.20	2.69	Te-121*	154.0 d	γ	88.6	*Te-121*	*16.78 d*
Te	Te-12	0.001	22.20	2.69	Te-121*	154.0 d	β+	11.4		
Te	Te-122	0.026	79.90	3.86	Te-123*	119.7 d	γ	100.0		
Te	Te-124	0.0482	5.13	7.79	Te-125*	57.40 d	γ	100.0		
Te	Te-126	0.1895	8.05	1.19	Te-127	9.350 h	β–	100.0		
Te	Te-126	0.1895	8.05	1.19	Te-127*	109.0 d	γ	97.6	*Te-127*	*9.350 h*
Te	Te-126	0.1895	8.05	1.19	Te-127*	109.0 d	β–	2.4		
Te	Te-128	0.3169	1.73	0.247	Te-129	1.160 h	β–	100.0		
Te	Te-128	0.3169	1.73	0.247	Te-129*	33.60 d	β–	36.0		
Te	Te-128	0.3169	1.73	0.247	Te-129*	33.60 d	γ	64.0	*Te-129*	*1.160 h*
Te	Te-130	0.338	0.259	0.31	Te-131	25.00 m	β–	100.0	I -131	8.040 d
Te	Te-130	0.338	0.259	0.31	Te-131*	1.250 d	β–	77.8	I -131	8.040 d
Te	Te-130	0.338	0.259	0.31	Te-131*	1.250 d	γ	22.2	*Te-131*	*25.00 m*
I	I -127	1.00	148.0	7.09	I -128	24.99 m	β+	6.9		
I	I -127	1.00	148.0	7.09	I -128	24.99 m	β–	93.1		
Xe	Xe-124	0.001	2950.	190.	Xe-125	16.90 h	β+	100.0	I -125	59.41 d
Xe	Xe-126	0.0009	43.90	2.52	Xe-127	36.40 d	β+	100.0		

Target	Isotope	Natur. Conc.	Reson. Integr	Therm. X-sect	Activated Isotope	half-life activated	Decay mode	Decay Br. R.	Next Isotope	half-life next Isot.
Xe	Xe-126	0.0009	43.90	2.52	Xe-127*	1.153 m	γ	100.0	*Xe-127*	*36.40 d*
Xe	Xe-128	0.0191	10.70	6.13	Xe-129*	8.890 d	γ	100.0		
Xe	Xe-13	0.041	15.30	29.80	Xe-131*	11.90 d	γ	100.0		
Xe	Xe-132	0.269	4.46	0.517	Xe-133	5.243 d	β−	100.0		
Xe	Xe-132	0.269	4.46	0.517	Xe-133*	2.190 d	γ	100.0	*Xe-133*	*5.243 d*
Xe	Xe-134	0.104	0.591	0.303	Xe-135	9.140 h	β−	100.0		
Xe	Xe-134	0.104	0.591	0.303	Xe-135*	15.29 m	γ	100.0	*Xe-135*	*9.140 h*
Xe	Xe-134	0.104	0.591	0.303	Xe-135*	15.29 m	β−	0.004		
Xe	Xe-136	0.089	0.116	0.299	Xe-137	3.818 m	β−	100.0		
Cs	Cs-133	1.00	393.0	33.20	Cs-134*	2.910 h	γ	100.0		
Ba	Ba-130	0.0011	176.0	13.0	Ba-131	11.80 d	β+	100.0	Cs-131	9.690 d
Ba	Ba-130	0.0011	176.0	13.0	Ba-131*	14.60 m	γ	100.0	*Ba-131*	*11.80 d*
Ba	Ba-132	0.001	30.40	8.06	Ba-133*	1.621 d	β+	0.01		
Ba	Ba-132	0.001	30.40	8.06	Ba-133*	1.621 d	γ	99.99		
Ba	Ba-134	0.0242	24.60	2.30	Ba-135*	1.196 d	γ	100.0		
Ba	Ba-136	0.0785	2.02	0.458	Ba-137*	2.552 m	γ	100.0		
Ba	Ba-138	0.717	0.23	0.413	Ba-139	1.384 h	β−	100.0		
La	La-139	0.9991	10.50	10.30	La-140	1.678 d	β−	100.0		
Ce	Ce-136	0.0019	64.30	7.18	Ce-137	9.000 h	β+	100.0		
Ce	Ce-136	0.0019	64.30	7.18	Ce-137*	1.433 d	γ	99.22	*Ce-137*	*9.000 h*
Ce	Ce-136	0.0019	64.30	7.18	Ce-137*	1.433 d	β+	0.78		
Ce	Ce-138	0.0025	3.08	1.25	Ce-139	137.6 d	β+	100.0		
Ce	Ce-140	0.8848	0.235	0.651	Ce-141	32.50 d	β−	100.0		
Ce	Ce-142	0.1108	0.835	1.15	Ce-143	1.377 d	β−	100.0	Pr-143	13.57 d
Pr	Pr-141	1.00	17.10	13.20	Pr-142	19.12 h	β−	99.98		
Pr	Pr-141	1.00	17.10	13.20	Pr-142	19.12 h	β+	0.02		
Pr	Pr-141	1.00	17.10	13.20	Pr-142*	14.60 m	γ	100.0	*Pr-142*	*19.12 h*
Nd	Nd-146	0.1719	2.77	1.61	Nd-147	10.98 d	β−	100.0		
Nd	Nd-148	0.0576	14.50	2.85	Nd-149	1.720 h	β−	100.0	Pm-149	2.212 d
Nd	Nd-150	0.0564	15.80	1.38	Nd-151	12.44 m	β−	100.0	Pm-151	1.183 d
Sm	Sm-144	0.031	1.75	1.88	Sm-145	340.0 d	β+	100.0		
Sm	Sm-152	0.267	2740.	236.0	Sm-153	1.928 d	β−	100.0		
Sm	Sm-154	0.227	35.50	9.64	Sm-155	22.30 m	β−	100.0		
Eu	Eu-151	0.478	1850.	10700.	Eu-152*	9.274 h	β−	72.0		
Eu	Eu-151	0.478	1850.	10700.	Eu-152*	9.274 h	β+	28.0		
Eu	Eu-151	0.478	1850.	10700.	Eu-152**	1.600 h	γ	100.0		
Eu	Eu-153	0.522	1390.	359.0	Eu-154*	46.30 m	γ	100.0		
Gd	Gd-152	0.002	898.0	1210.	Gd-153	241.6 d	β+	100.0		
Gd	Gd-158	0.2484	63.70	2.86	Gd-159	18.56 h	β−	100.0		
Gd	Gd-160	0.2186	7.80	0.874	Gd-161	3.660 m	β−	100.0	Tb-161	6.880 d
Tb	Tb-159	1.00	469.0	31.70	Tb-160	72.30 d	β−	100.0		

Target	Isotope	Natur. Conc.	Reson. Integr.	Therm. X-sect	Activated Isotope	half-life activated	Decay mode	Decay Br. R.	Next Isotope	half-life next Isot.
Dy	Dy-156	0.0006	953.0	37.90	Dy-157	8.140 h	β+	100.0		
Dy	Dy-158	0.001	179.0	49.20	Dy-159	144.4 d	β+	100.0		
Dy	Dy-164	0.282	174.0	2890.	Dy-165	2.334 h	β−	100.0		
Dy	Dy-164	0.282	174.0	2890.	Dy-165*	1.257 m	γ	97.76	*Dy-165*	*2.334 h*
Dy	Dy-164	0.282	174.0	2890.	Dy-165*	1.257 m	β−	2.24		
Ho	Ho-165	1.00	755.0	76.10	Ho-166	1.118 d	β−	100.0		
Er	Er-162	0.0014	520.	30.	Er-163	1.250 h	β+	100.0		
Er	Er-164	0.0161	143.0	15.0	Er-165	10.36 h	β+	100.0		
Er	Er-168	0.268	40.60	3.19	Er-169	9.400 d	β−	100.0		
Er	Er-170	0.149	58.10	6.73	Er-171	7.516 h	β−	100.0		
Tm	Tm-169	1.00	1700.	120.	Tm-170	128.6 d	β+	0.15		
Tm	Tm-169	1.00	1700.	120.	Tm-170	128.6 d	β−	99.85		
Yb	Yb-168	0.0013	378.0	2660.	Yb-169	32.03 d	β+	100.0		
Yb	Yb-174	0.318	21.0	79.30	Yb-175	4.185 d	β−	100.0		
Yb	Yb-176	0.127	6.64	3.28	Yb-177	1.911 h	β−	100.0	Lu-177	6.734 d
Lu	Lu-175	0.9741	644.0	29.80	Lu-176*	3.635 h	β−	99.91		
Lu	Lu-175	0.9741	644.0	29.80	Lu-176*	3.635 h	β+	0.1		
Lu	Lu-176	0.0259	896.0	2810.	Lu-177	6.734 d	β−	100.0		
Lu	Lu-176	0.0259	896.0	2810.	Lu-177*	160.4 d	β−	78.3		
Lu	Lu-176	0.0259	896.0	2810.	Lu-177*	160.4 d	γ	21.7	*Lu-177*	*6.734 d*
Hf	Hf-174	0.0016	295.0	463.0	Hf-175	70.00 d	β+	100.0		
Hf	Hf-176	0.0521	613.0	16.20	Hf-177**	51.40 m	γ	100.0		
Hf	Hf-178	0.273	1910.	90.	Hf-179**	25.10 d	γ	100.0		
Hf	Hf-179	0.1363	540.	44.70	Hf-180*	5.500 h	γ	98.6		
Hf	Hf-179	0.1363	540.	44.70	Hf-180*	5.500 h	β−	1.4	Ta-180	8.152 h
Hf	Hf-180	0.351	34.40	15.0	Hf-181	42.39 d	β−	100.0		
Ta	Ta-181	0.9999	657.0	23.70	Ta-182	114.4 d	β−	100.0		
Ta	Ta-181	0.9999	657.0	23.70	Ta-182**	15.84 m	γ	100.0		
W	W -180	0.0013	248.0	42.80	W -181	121.2 d	β+	100.0		
W	W -184	0.3067	16.10	1.95	W -185	75.10 d	β−	100.0		
W	W -184	0.3067	16.10	1.95	W -185*	1.670 m	γ	100.0	*W -185*	*75.10 d*
W	W -186	0.286	344.0	43.30	W -187	23.72 h	β−	100.0		
Re	Re-185	0.374	1710.	129.0	Re-186	3.777 d	β−	93.1		
Re	Re-185	0.374	1710.	129.0	Re-186	3.777 d	β+	6.9		
Re	Re-187	0.626	288.0	87.90	Re-188	16.98 h	β−	100.0		
Re	Re-187	0.626	288.0	87.90	Re-188*	18.60 m	γ	100.0	*Re-188*	*16.98 h*
Os	Os-184	0.0002	869.0	3430.	Os-185	93.60 d	β+	100.0		
Os	Os-188	0.133	153.0	5.36	Os-189*	5.800 h	γ	100.0		
Os	Os-189	0.161	837.0	28.90	Os-190*	9.900 m	γ	100.0		

Target	Isotope	Natur. Conc.	Reson. Integr.	Therm. X-sect	Activated Isotope	half-life activated	Decay mode	Decay Br. R.	Next Isotope	half-life next Isot.
Os	Os-190	0.264	24.20	15.0	Os-191	15.40 d	β–	100.0		
Os	Os-190	0.264	24.20	15.0	Os-191*	13.10 h	γ	100.0	*Os-191*	*15.40 d*
Os	Os-192	0.41	6.12	2.29	Os-193	1.271 d	β–	100.0		
Ir	Ir-191	0.373	1170.	1100.	Ir-192	73.83 d	β–	95.24		
Ir	Ir-191	0.373	1170.	1100.	Ir-192	73.83 d	β+	4.76		
Ir	Ir-191	0.373	1170.	1100.	Ir-192*	1.450 m	γ	99.98	*Ir-192*	*73.83 d*
Ir	Ir-191	0.373	1170.	1100.	Ir-192*	1.450 m	β–	0.02		
Ir	Ir-193	0.627	1310.	128.0	Ir-194	19.15 h	β–	100.0		
Ir	Ir-193	0.627	1310.	128.0	Ir-194*	171.0 d	β–	100.0		
Pt	Pt-190	0.0001	86.70	175.0	Pt-191	2.900 d	β+	100.0		
Pt	Pt-192	0.0079	162.0	12.90	Pt-193*	4.330 d	γ	100.0		
Pt	Pt-194	0.329	8.15	1.65	Pt-195*	4.020 d	γ	100.0		
Pt	Pt-196	0.253	5.95	0.813	Pt-197	18.30 h	β–	100.0		
Pt	Pt-196	0.253	5.95	0.813	Pt-197*	1.590 h	β–	3.3		
Pt	Pt-196	0.253	5.95	0.813	Pt-197*	1.590 h	γ	96.7	*Pt-197*	*18.30 h*
Pt	Pt-198	0.072	52.70	4.34	Pt-199	30.80 m	β–	100.0	Au-199	3.139 d
Au	Au-197	1.00	1550.	113.0	Au-198	2.693 d	β–	100.0		
Au	Au-197	1.00	1550.	113.0	Au-198*	2.300 d	γ	100.0	Au-198	2.693 d
Hg	Hg-196	0.0014	230.	3520.	Hg-197	2.672 d	β+	100.0		
Hg	Hg-196	0.0014	230.	3520.	Hg-197*	23.80 h	γ	93.0	*Hg-197*	*2.672 d*
Hg	Hg-196	0.0014	230.	3520.	Hg-197*	23.80 h	β+	7.0		
Hg	Hg-198	0.1002	74.80	2.28	Hg-199*	42.60 m	γ	100.0		
Hg	Hg-202	0.298	2.65	5.68	Hg-203	46.61 d	β–	100.0		
Hg	Hg-204	0.0685	0.256	0.492	Hg-205	5.200 m	β–	100.0		
Tl	Tl-205	0.7048	0.648	0.119	Tl-206	4.199 m	β–	100.0		
Tl	Tl-205	0.7048	0.648	0.119	Tl-206*	3.740 m	γ	100.0	*Tl-206*	*4.199 m*
Pb	Pb-208	0.524	0.61	0.06	Pb-209	3.253 h	β–	100.0		
Bi	Bi-209	1.00	0.202	0.0389	Bi-210	5.013 d	α	0.0	Tl-206	4.199 m
Bi	Bi-209	1.00	0.202	0.0389	Bi-210	5.013 d	β–	100.0	Po-210	138.4 d
Th	Th-232	1.00	83.50	8.49	Th-233	22.30 m	β–	100.0	Pa-233	26.97 d

AMENDED SHEET